

# NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorder Division

Washington, D.C. 20594

October 13, 2017

## Furuno FELCOM 15 Mobile Earth Station

Specialist's Factual Report  
by Douglas Mansell

### 1. EVENT

Location: 40 Miles NE of Crooked Islands, Bahamas  
Date: October 1, 2015  
Aircraft: Cargo Ship  
Registration: IMO: 7395351  
Operator: Tote Services  
NTSB Number: DCA16MM001

On Thursday, October 1, 2015, about 0715 EDT, the US Coast Guard received distress alerts from the 790-foot roll-on/roll-off container ship *El Faro*. The US-flagged ship, owned by TOTE Maritime Puerto Rico (formerly Sea Star Line, LLC) and operated by TOTE Services (TOTE), was 40 nautical miles northeast of Acklins and Crooked Islands, Bahamas, and close to the eye of Hurricane Joaquin. The ship was en route from Jacksonville, Florida, to San Juan, Puerto Rico, with a cargo of containers and vehicles. Just minutes before the distress alerts, the *El Faro* master had called TOTE's designated person ashore (DPA) and reported that a scuttle had popped open on deck two and that there was free communication of water into the No. 3 hold. He said the crew had controlled the ingress of water but that the ship was listing 15° and had lost propulsion. The Coast Guard and TOTE were unable to reestablish communication with the ship. Twenty-eight US crewmembers, including an off-duty engineering officer sailing as a supernumerary, and five Polish workers were on board. The vessel sank in 15,300 feet of water.

The Coast Guard, US Navy, and US Air Force dispatched multiple assets to the ship's last known position, but the search was hampered by hurricane-force conditions on scene. On Sunday, October 4, a damaged lifeboat and liferaft were located. The same day, the Coast Guard found a deceased crewmember wearing an immersion suit. A Coast Guard helicopter dropped a locator buoy near the body in the immersion suit and left to investigate reported signs of life elsewhere but then could not relocate the immersion suit. No signs of life were found, and on Monday, October 5, a debris field and oil slick were discovered. The Coast Guard determined that *El Faro* was lost and declared the event a major marine casualty. The Coast Guard suspended the unsuccessful search for survivors at sundown on Wednesday, October 7.

### 2. DETAILS OF INVESTIGATION

On March 9, 2017, investigators from the NTSB and the US Coast Guard Marine Board of Investigation traveled to Furuno's support center in Denton, Maryland for familiarization and

hands-on testing of a Furuno FELCOM 15 mobile earth station (MES). Distress messages, including the Inmarsat-C distress alert and the ship's security alert system (SSAS) messages, received from *El Faro* were transmitted from a Furuno FELCOM 15 MES, installed on the bridge. Discrepancies of interpretation of the position reports received by authorities, noted in the Electronic Data Group Chairman's Factual Report, warranted further investigation to understand how distress alerts are initiated and sent.

## 2.1. Device Description

The Furuno FELCOM 15 is a Global Maritime Distress and Safety System (GMDSS) compliant Inmarsat C mobile earth station. Via satellite communications to a land earth station (LES), the FELCOM 15 MES provides store-and-forward telex communications between ships and other parties at sea or on land. The FELCOM 15 supports a full range of Inmarsat-C communications functionality, including Enhanced Group Call (EGC), FleetNET, SafetyNET, distress message handling, data reporting, and email. Distress messages include the ship's own position, and dedicated software enables customized messaging.

The unit consists of an omni-directional antenna, a 10.4 inch color LCD display with processor unit, and a keyboard. The distress alert button is incorporated into the front of the display. A front-loading disc drive allows data to be loaded into the unit. An optional GPS module is available for position reporting without the operator's intervention. GMDSS compliance can be achieved by adding a printer. SSAS may also be connected to the FELCOM 15 system.

Figure 1 is a photo of a representative GMDSS console installation, which includes a Furuno FELCOM 15 terminal (lower right) and associated printer (upper right). As indicated in the picture, the equipment is commonly installed alongside telex, single side band radio, and VHF radio equipment.



**Figure 1.** The Furuno FELCOM 15 terminal (lower right) and printer (upper right) used during test.

## 2.2. Test Information

Several distress alerts were transmitted during testing on March 9, 2017, including Inmarsat-C and SSAS messages. Advanced coordination with the receiving land earth station (LES) and emergency response personnel ensured everyone involved knew the live test was not a real emergency.

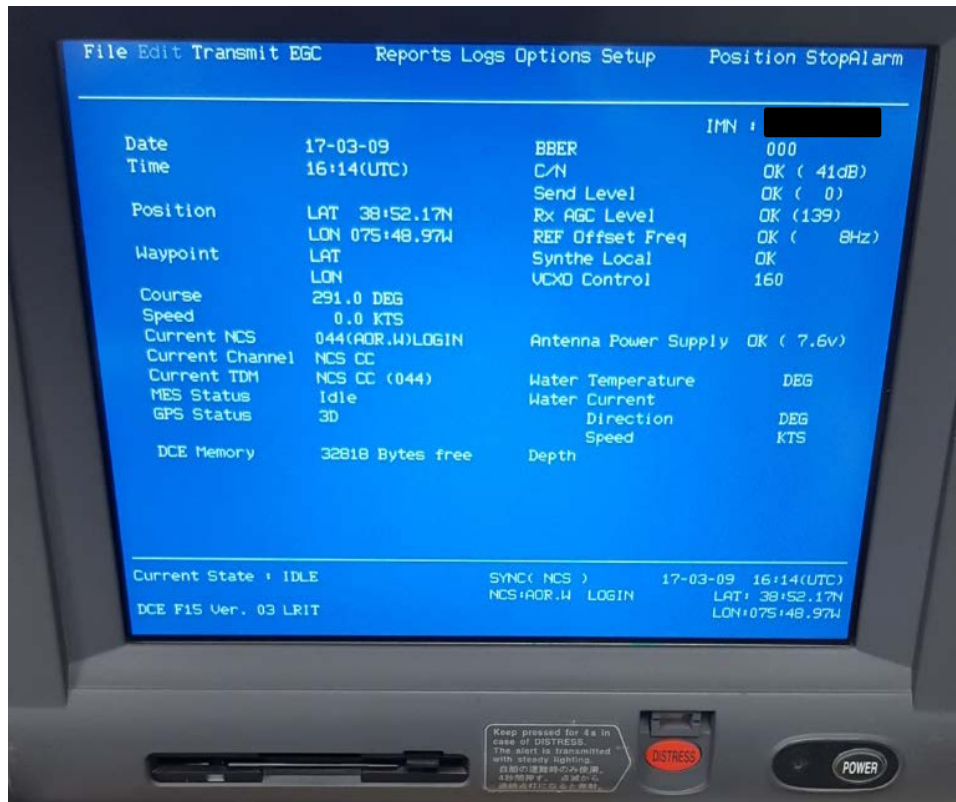
### 2.2.1. SSAS Alert Messages

After configuring the SSAS with desired test recipients' email addresses, SSAS alert messages were successfully transmitted to all recipients. The SSAS operated as expected, with no anomalies noted. Time and position information contained within the SSAS messages were automatically populated by the internal GPS source. One SSAS message received by an NTSB participant from the day of testing is provided below:

```
--- SSAS ALERT MESSAGE ---  
Vessel Name: Furuno Denton  
MMSI: [REDACTED]  
IMN: [REDACTED]  
Test... Test... Test...  
LAT: 38:52.17N  
LON: 075:48.97W  
Time: 03/09/2017 20:38:59(UTC)  
COURSE: 316 deg  
SPEED: 00 kt  
Time: 03/09/2017 20:39:01(UTC)
```

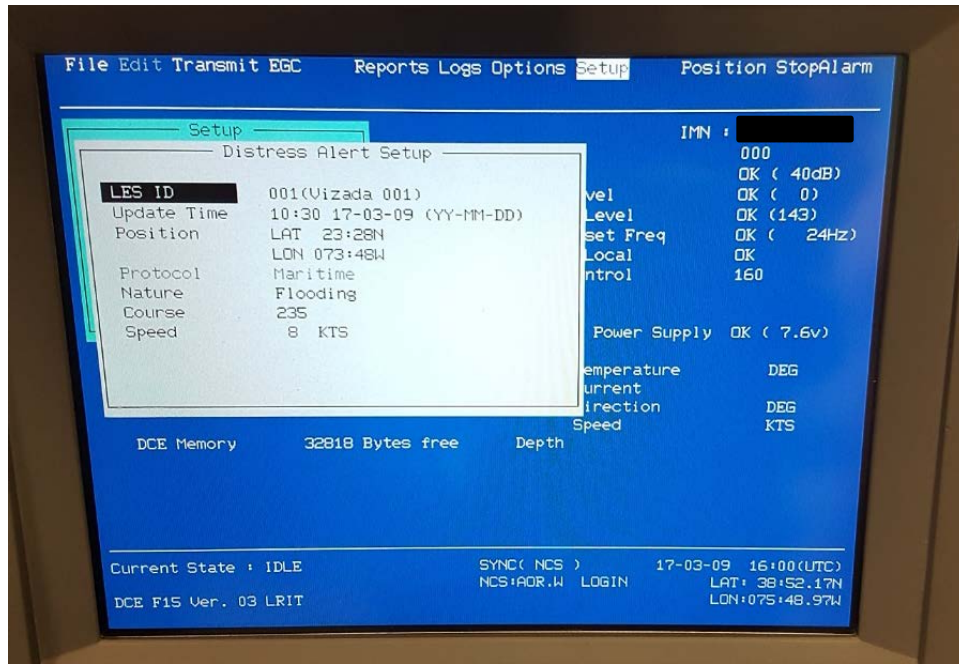
### 2.2.2. Inmarsat C Distress Alerts

Figure 2 shows the FELCOM 15 terminal's standby display, which indicates date and time, ship's position, and various system status indications. When equipped with an internal GPS navigator, as was installed on *El Faro*, the date, time, and ship position are automatically updated, unless manual inputs by the user override the autonomous entries.



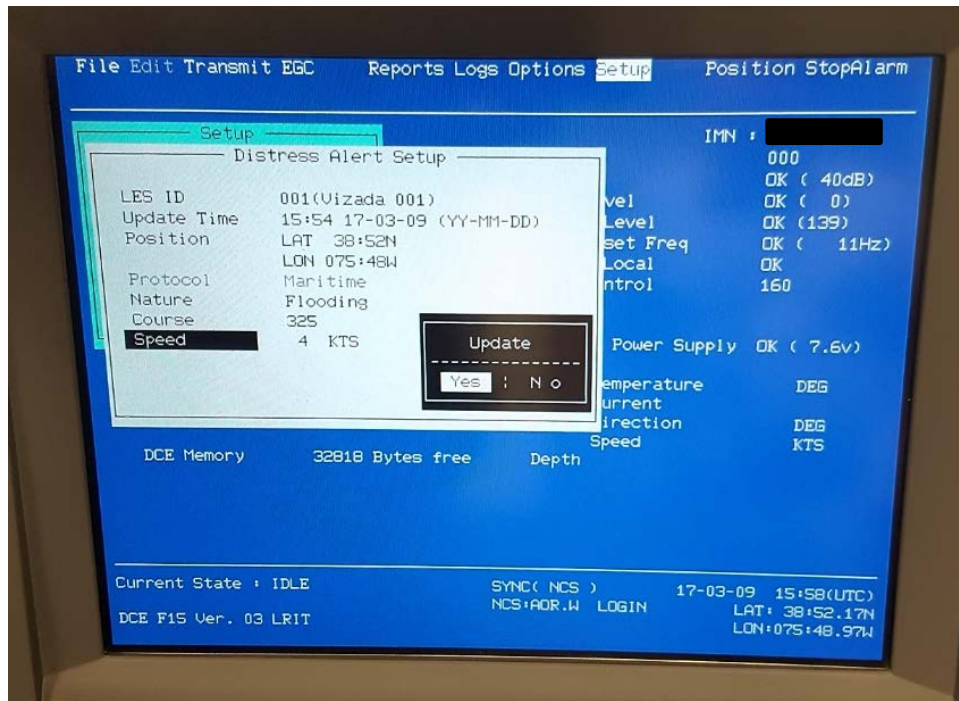
**Figure 2.** Furuno FELCOM 15 standby display.

Figure 3 shows the Distress Alert Setup display, which allows the user to modify the properties of the distress alert message, if desired. The modifiable properties include: LES ID, Update Time, Position, Nature, Course, and Speed. Ship's Position may be manually updated from this Setup display, or directly from the Position menu, visible near the upper right of the standby display. Values displayed in Figure 3 were manually entered during testing to match distress alert values received from *El Faro*.



**Figure 3.** Furuno FELCOM 15 Distress Alert Setup display.

When exiting the Distress Alert Setup page, the user is prompted to select Yes or No, to either update the manually-entered settings or not. Figure 4 shows the user prompt.



**Figure 4.** Furuno FELCOM 15 prompt to update manual entries upon exiting Distress Alert Setup.



At any time, the user can activate the distress alert by pressing the red distress alert button on the FELCOM 15 display. Figure 5 shows the unit's indication of a distress alert activation, stating the date and time, "Distress Alert activated" and "Sending Distress Alert." The time noted in the activation is the current time given in UTC and is different from the Update Time entered manually by the user on the Distress Alert Setup screen. In addition to the visible indications of message transmission on the display, the unit also provides audible indication that a message is being sent. After successfully sending a distress alert, positive confirmation is displayed on the screen, and logged by the associated printer.



**Figure 5.** Furuno FELCOM 15 distress alert activation.

Testing confirmed that the position reported in Inmarsat-C distress alerts from the FELCOM 15 terminal was the LAT and LON position manually entered by the user in the Distress Alert Setup page, not the unit's present location at the Furuno service facility. Even though the system was equipped with an internal GPS receiver, manual entries superseded automatic position reports. If a manual entry differs from the actual position, the system does not provide a warning or prompt the user of potential discrepancies. After a single manual entry, automatic tracking is disabled for the remainder of the given power cycle.